

### **REMARKS**

In the aforementioned claim amendments, claims 4, 5 and 9 have been canceled and claims 15-27 added. Now pending in the application are claims 1-3, 6-8 and 10-27, of which claims 1 and 10 are independent. The following comments address all stated grounds for rejection and place the presently pending claims, as identified above, in condition for allowance.

#### **Claim Amendments**

Claims have been amended to clarify the scope of the claimed invention. In particular, claims 1 and 10 have been amended to recite that *a layer of dielectric material is disposed directly on the semi-insulating material*. Support for the claim amendments could be found in Fig. 5 and corresponding descriptions at page 4 of the Specification. No new matter has been introduced. Amendment of claims 2-3, 6-8, and 10-14 are meant to allow one skilled in the art to more fully appreciate the claimed invention and are not directed to any art rejection. Applicants therefore request that the amendments be entered, and the claims passed to allowance.

#### **Objection to Drawings**

The drawings are objected to under 37 C.F.R. §1.83(a) because Figs. 2-5 fail to show p-n-p or n-p-n-p layers recited in the claims. In response to the objection to the drawings, Applicants have amended claims to remove the recitation of p-n-p or n-p-n-p layers from the claims. In light of the claim amendments, Applicants believe that the drawings are in condition for allowance.

#### **Claim Rejection under 35 U.S.C. §112**

Claims 1-14 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Claim 1 is rejected as being confusing, vague and indefinite because claim 1 recites only the step of producing a hybrid confinement region without any support. In response to the rejection, Applicants have amended claim 1 to add the step of disposing a dielectric layer to support the step of producing a hybrid confinement region. Claim 1 is also rejected because claim 1 recites p-n-p layers that are not shown in figures. In response to the rejection, Applicants have amended claim 1 to remove the recitation of p-n-p layers from claim 1. In light of amended claim 1, Applicants request that the Examiner reconsider and withdraw the present rejection.

Claim 10 is rejected as being confusing, vague and indefinite because claim 10 recites n-p-n-p layers that are not shown in figures. In response to the rejection, Applicants have amended claim 10 to remove the recitation of n-p-n-p layers from claim 10. In light of amended claim 10, Applicants request that the Examiner reconsider and withdraw the present rejection.

Claim Rejections under 35 U.S.C. §102(e)

Claims 1-2, 4-11 and 13-14 are rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,287,884 of Jie *et al.* (hereinafter “Jie”). Applicants respectfully traverse this rejection in light of the above amendments and the following remarks.

Amended claim 1 recites a method for fabricating a buried heterostructure semiconductor device. The method includes a step of disposing a layer of first material doped with a first dopant and a layer of second material doped with a second dopant in a selected sequence adjacent to selected surface portions of the active layer. The method also includes a step of disposing a semi-insulating material adjacent to the layers of the first and second materials. The method further includes a step of *disposing a layer of dielectric material directly on the semi-insulating material*. Claim 10 is directed to a semiconductor device that recites similar limitations.

Jie discloses a semiconductor device that includes a ridge mesa containing a lower confinement layer, an active layer and an upper grating confinement layer. The semiconductor device also includes a first InP cladding layer and a native oxidized Al-bearing layer. The semiconductor layers further include a second InP cladding layer, a contact layer, a contact metal, and a second ridge mesa covered with an insulating layer.

Applicants respectfully submit that Jie fails to disclose each and every element of the claimed invention. Specifically, Jie fails to disclose *a layer of dielectric material is disposed directly on the semi-insulating material*, as recited in amended claims 1 and 10. Jie discloses in Fig. 1H a structure containing an n-InP buffer (2), p- and n-current blocking layers (8 and 9), a p-upper cladding layer (10), and a dielectric film (13). Jie further discloses a trench isolation structure that may inhibit heat removal from the active layer. In contrast to Jie, a significant benefit of the invention recited in amended claims 1 and 10 is the elimination of the need for isolation channels (trenches) parallel to the active layer to electrically isolate the active region. Jie discloses that the dielectric film is disposed over the trench. Jie, however, does not disclose that the dielectric film is disposed *directly* on a semi-insulating layer.

In light of the amendments and arguments set forth above, Jie fails to disclose each and every element of the claimed invention. Hence, Jie does not anticipate amended claims 1-2, 4-11, and 13-14. Applicants therefore request the Examiner to reconsider and withdraw the rejection of amended claims 1-2, 4-11 and 13-14 under 35 U.S.C. §102(e), and pass the pending claims to allowance.

Claim Rejections under 35 U.S.C. §102(b)

Claims 1-14 are rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,452,315 of Kimura *et al.* (hereinafter "Kimura"). Applicants respectfully traverse this rejection in light of the above amendments and the following remarks.

Kimura discloses a semiconductor laser (101).

Applicants respectfully submit that Kimura fails to disclose each and every element of amended claims 1-3, 6-8, and 9-14. Specifically, Kimura fails to disclose that *a layer of dielectric material is disposed directly on the semi-insulating material*, as recited in amended claims 1 and 10. Kimura discloses in Fig. 1, n- and p- blocking layers (4 and 6) that are not etched. Kimura provides an insulating window layer (10) and an unetched semi-insulating layer (5) between which an n-type InP upper lading layer (3b) and an n-type InP contact layer (70) are disposed. That is, the insulating window layer (10) of Kimura is disposed on the n-type InP contact layer (70). Kimura, however, does not disclose that the insulating window layer (10) is disposed directly on the semi-insulating layer (5).

In light of the amendments and arguments set forth above, Kimura does not anticipate the amended claims 1-14. Applicants therefore request the Examiner to reconsider and withdraw the rejection of claims 1-14 under 35 U.S.C. §102(b), and pass the pending claims to allowance.

Claim Rejection under 35 U.S.C. §103(a)

Claims 3 and 12 are rejected under 35 U.S.C. §103(a) as being unpatentable over Jie in view of U.S. Patent No. 6,421,492 of Weber. (hereinafter “Weber”). Applicants respectfully traverse this rejection in light of the above amendments and the following remarks.

Weber relates to an optical device for transferring light power from a laser to an optical fiber with a minimal loss of light at the coupling of the laser with the optical fiber. The device comprises a passive waveguide (2) and an active waveguide (4) wherein the power of the laser light signal is transferred from the active waveguide to the passive waveguide.

Applicants respectfully submit that Jie and Weber fail to teach or suggest all of the claim limitations of amended claims 3 and 4. Applicants note that claim 3 depends on claim 1 and

therefore incorporates the patentable features recited in claim 1. Applicants also note that claim 12 depends on claim 10 and therefore incorporates the patentable features recited in claim 10. Applicants submit that Jie and Weber fail to teach or suggest *a layer of dielectric material disposed directly on the semi-insulating material*, as recited in amended claims 1 and 10. Weber discloses in Fig. 1 a waveguide that includes a semi-insulating (Fe-doped) InP that is used to form current blocking layers (28). Weber does not teach or suggest a semi-insulating layer on which a layer of dielectric material is directly disposed. Hence, Weber fails to bridge the factual differences of the Jie patent. Accordingly, Jie in view of Weber fail to detract from the patentability of claims 3 and 12.

In light of the arguments set forth above, Jie and Weber fail to teach or suggest all of the claim limitations of amended claims 1 and 10. Claims 3 and 12, which depend on amended claim 1 and 10, respectively, are not rendered obvious over the cited prior art. Applicants therefore request the Examiner to reconsider and withdraw the present rejection under 35 U.S.C. §103(a), and pass the pending claims to allowance.

#### New Claims

New claims 15-20 depend on amended claim 1 and therefore incorporate the patentable features of the independent claim. New claims 15-20 add limitations to claim 1 to clarify the scope of the claimed invention. Based on the claim amendments and arguments set forth above, Applicants submit that new claims 15-20 are patentable and in condition for allowance.

New claims 21-27 depend on amended claim 10 and therefore incorporate the patentable features of the independent claim. New claims 21-27 add limitations to claim 10 to clarify the scope of the claimed invention. Based on the claim amendments and arguments set forth above, Applicants submit that new claims 21-27 are patentable and in condition for allowance.

**CONCLUSION**

In light of the aforementioned claim amendments and arguments, Applicants contend that each of the Examiners rejections has been adequately addressed and the pending application is in condition for allowance. Should the Examiner feel that a telephone conference with Applicants' attorney would expedite prosecution of this application, the Examiner is urged to contact the Applicants' attorney at (617) 227-7400.

Respectfully submitted,

By David R. Burns  
David R. Burns  
Reg. No. 46,590  
Attorney for Applicants

LAHIVE & COCKFIELD, LLP  
28 State Street  
Boston, MA 02109  
(617) 227-7400

Date: **March 24, 2004**

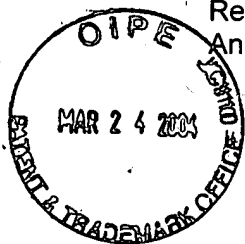


FIG. 2

